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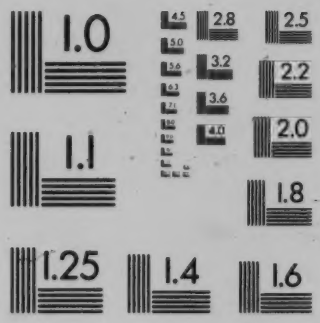

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THE UNIVERSITY OF ALBERTA

IMPLICIT CAUSALITY IN VERBS:
THE INFLUENCE OF RELATED DISPOSITIONAL TERMS

(C)

BY

MARIA ANNA TCHIR

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE

OF MASTER OF ARTS

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EDMONTON, ALBERTA

FALL, 1988

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled IMPLICIT CAUSALITY IN VERBS: THE INFLUENCE OF RELATED DISPOSITIONAL TERMS submitted by Maria Anna Tchir in partial fulfillment of the requirements for the degree of Master of Arts.

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Supervisor

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.....

Date: September 20, 1988

Abstract

Concepts of causality implicit in natural language were studied by Brown and Fish (1983). Using action and state verbs in the context "Ted _____ Paul", these researchers found that causal attributions were unequally apportioned between interactants, e.g., Ted likes Paul primarily because of something about Paul, not something about Ted. Furthermore, they found an apparent link between causal attributions to the subject or object of interactive sentences and the availability of dispositional terms (derived from the sentence verb) which describe that subject or object, e.g., in Ted likes Paul, people perceive Paul as having caused the liking to occur because he is a likable person. Brown and Fish suggest that an Agent-Patient schema (governing action verbs) and a Stimulus-Experiencer schema (governing state verbs) influence both causal attributions to the Agent or Stimulus in the interaction and the development of trait terms that refer to those roles. The Agent-Patient schema specifies that the person who initiates or performs an act, the Agent of the interaction, is perceived as its cause; the Stimulus-Experiencer schema specifies that the person who stimulates or gives rise to the experience, the Stimulus of the interaction, is perceived as its cause. We hypothesized that the existence of trait terms describing the Patient or Experiencer of an interaction would bias causal attributions to those roles, or at least reduce the tendency to assign greater causal weight to the Agent or Stimulus. Because Brown and Fish did not study verbs with Patient or Experiencer adjectives, their research did not test this possibility.

We compiled a comprehensive list of interactive verbs and their related dispositional terms and pretested a random sample for their significance, familiarity, and adequacy in answering the causal question "Why did Ted _____ Paul?" Verbs with Patient and Experiencer terms, as well as ones with Agent and Stimulus terms, were used in Experiment 1 to determine whether causal attributions differ as a function of type of derived adjectival form. In order to rule out potential confounds in Experiment 1, nonsense verbs were used in Experiment 2 to test a similar hypothesis. In both experiments, the degree (and to some extent the direction) of bias toward an interactive role was highly related to the role to which the derived dispositional terms refer.

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Introduction

Whorf (1956) proposed that language is essentially a system of words and grammar that lends structure to our ideas and our perceptions of reality. Language may inherently possess structural or conceptual features that influence how we perceive ourselves and our world. One of these features studied within the last 15 years is implicit causality in natural language.

Though not the first researchers to do so (see Garvey & Caramazza, 1974; Garvey, Caramazza, & Yates, 1977; Caramazza, Grober, Garvey, & Yates, 1977), Brown and Fish (1983) studied concepts of causality implicit in verbs. They confirmed that people consistently assign the cause of an interaction expressed by a verb to a particular interactant, even when they are provided with minimal information about the event. In interactive contexts like "Ted _____ Paul" (where the blank is replaced by a verb), people consistently agree that one of the two interactants has a disproportionate causal influence on the interaction. For instance, Ted likes Paul. Why? People agree that it is something about Paul that causes Ted to like him, not something about Ted. As in the above example, such causal attributions are not necessarily coincident with the surface subject of interactive sentences.

Brown and Fish (1983) found that causal attributions to the subject or object of their sentences were related to the availability of trait terms which describe that subject or object. For instance, Ted competes with Paul because Ted is competitive; Ted notices Paul because Paul is noticeable.

Rather than adopting the Whorfian view that language influences thought, however, Brown and Fish (1983) suggest that two universal causal schemas govern both the attribution of causality and the development of language. The Agent-Patient schema, which governs verbs that represent actions, encourages the development and use of adjectives that refer to the Agent of the interaction; e.g., Ted abused Paul because Ted is abusive, not because Paul is abusable. Within the interaction, the Agent is the role of initiating or performing an action, and the Patient is the role of being acted upon. The Stimulus-Experiencer schema, which governs verbs that represent a state or experience, encourages the development and use of adjectives that refer to the Stimulus of the interaction; e.g., Ted charmed Paul because Ted is charming, not because Paul is charmable. The Stimulus is the role of giving rise to an experience, and the Experiencer is the role of having the experience. The English language, viewed as an abstract generative system, does allow trait terms such as abusable and charmable, i.e., adjectives or nouns that refer to the Patient and Experiencer roles in the interaction, but such terms are less frequent than are ones referring to the Agent or Stimulus roles.

Brown and Fish (1983) explained their results by postulating the existence of the above two causal schemas, primarily because a Whorfian view of language does not address the issue of by what principles language develops. In general, Brown and Fish suggest that dispositional terms referring to a role develop because they are particularly informative about that role. For action verbs, Agent adjectives are more informative about the Agent than are Patient

adjectives about the Patient. For instance, in Ted obstructed Paul, many people (like Paul) have the capacity to be obstructed by someone, but fewer people (like Ted) are able or or willing to obstruct others. For state verbs, Stimulus adjectives are more informative about the Stimulus than are Experiencer adjectives about the Experiencer. In Ted likes Paul, many people (like Ted) have the human capacity to experience liking for others, but fewer people (like Paul) are generally liked by others. In both schemas, the Agent and Stimulus are members of a subset of humanity, whereas the Patient and Experiencer are members of humanity in general. According to Brown and Fish (1983), then, dispositional terms that refer to the Agent and Stimulus are more informative about those roles and therefore develop more frequently in the English language.

Brown and Fish (1983) compiled three categories of verbs: verbs whose derived adjectives refer to the Agent [Stimulus] role, verbs whose adjectives refer to the Patient [Experiencer] role, and verbs with both types of adjectives. However, Brown and Fish's causal attribution studies included only those verbs with adjectives that refer to the Agent or Stimulus, presumably because they found relatively few verbs with adjectives that refer to the Patient or Experiencer. Out of their sample of around 300 interactive verbs, they found 18 verbs that have only Patient or Experiencer adjectives and 31 verbs with adjectives that refer to both the Agent and Patient or Stimulus and Experiencer. Their criteria for inclusion of trait terms (and therefore verbs as well) required that the trait term appear in the Kucera and Francis (1967) list of English words that occur one or more times in a million words of text, that it appear in

the outdated Allport and Odbert (1936) lexicon of trait terms, and that any trait term ending in "-ing" be listed as an adjective in the Oxford English Dictionary on Historical Principles. Because this probably resulted in the exclusion of many perfectly acceptable modern verbs and trait terms, we compiled a more comprehensive list of about 1,500 interactive verbs and 2,700 related adjectives and nouns.

Furthermore, because Brown and Fish (1983) did not study verbs with Patient and Experiencer adjectives, their research provided no evidence for or against a "Whorfian" interpretation of their results. According to Brown and Fish (1983), if the Agent-Patient [Stimulus-Experiencer] schema leads people to make causal attributions to the Agent [Stimulus], whether or not Patient [Experiencer] adjectives exist for a given verb should have no influence upon causal attributions. For instance, the Stimulus-Experiencer schema, according to Brown and Fish, biases causal attributions towards the Stimulus of the interaction. Therefore, there should be no difference in causal attributions between Ted likes Paul and Ted cares about Paul, i.e., the cause of the interaction should be attributed mainly to Paul. On the other hand, our hypothesis suggests that the existence of adjectives in the English language that refer to the Experiencer (or Patient) role might bias causal attributions towards those roles. For example, the Experiencer adjective caring is available, but liking is not. We therefore suggest that more causal weight will be assigned to the Experiencer in Ted cares about Paul than in Ted likes Paul.

Our objectives in this research, then, were to investigate the

generality of the Agent-Patient and Stimulus-Experiencer schemas as postulated by Brown and Fish (1983), and to explore the possibility that the effects of these schemas may depend on the existence of dispositional terms derived from the verb and referring to one or the other role in the interaction.

Compilation of Interactive Verbs and Related Dispositional Terms

Verbs

Our primary concern in compiling the original list of verbs was not to include verbs that are rare or obsolete in modern everyday English. We therefore included only verbs or forms of verbs found in the 1967 Kucera-Francis Computational Analysis of Present-Day American English or their 1982 Frequency Analysis of English Usage: Lexicon and Grammar. Both of these works contain a listing of words occurring with a frequency of one or greater in a million words of text. All words that appear in either of these sources and that make at least minimal sense as verbs in the interactive context "Ted _____ Paul" or "Ted _____ Mary" were included. Verbs that require a preposition or adverb to make sense in this context--a considerable proportion of the potential candidates--were also included (e.g., lived with, ticked off), as were hyphenated verbs (e.g., double-crossed).

Our initial list included approximately 2,100 verbs. To avoid offending our subjects, 4 obscene verbs were deleted from the list. Words that did not have an entry as verbs in the 1981 Webster's Third New International Dictionary, Unabridged were also eliminated, as were any verbs that required more than one preposition or adverb to make sense in the interactive context (e.g., knuckled under to). In

total, 23 verbs were eliminated by these criteria.

Still, however, the initial list of verbs contained many words that did not seem to express interactions between people that were meaningful in a psychological sense. Some verbs also expressed an interaction in which only a small minority of the population could participate. Where a large proportion of the general population is excluded, psychological inferences cannot be made about some trait or quality of the person, but usually only about a role that is performed by the person.

We therefore adopted the following criteria to eliminate verbs that do not permit meaningful causal attributions:

1. The verb must express a reasonably complete and meaningful interaction in the context "Ted _____ Paul" or "Ted _____ Mary"; it must not depend heavily on unstated information to make sense (e.g., granted).

2. The verb must name an interaction that is normally thought of as occurring between human beings (e.g., not nuzzled), that can occur on a one-to-one basis (e.g., not pillaged), and that would not be considered highly metaphorical or bizarre (e.g., jumbled).

3. The verb must not name an event that is normally thought of as occurring entirely by accident (e.g., stumbled against).

4. The verb must not name an interaction in which only a small minority of the population would normally be capable of engaging. Specifically, the verb must not name an interaction where one of the two parties must be a member of a certain occupation or profession (e.g., audited) or a member of a very specific demographic group (e.g., adopted). Interactions that may have gender-specific roles

(e.g., married) were, however, not excluded on that basis alone.

The two researchers independently went through the list of verbs and eliminated any which did not satisfy the above criteria. Agreement was 86%, and the disagreements were resolved by discussion. A total of about 600 verbs were thereby eliminated, resulting in a list of about 1,500 verbs.

Dispositional Terms

Adjectives and nouns related to the verbs were initially compiled from two sources: the 1981 Webster's unabridged dictionary and the Allport and Odbert (1936) list of trait terms. Criteria for including terms on the original list were minimal, the sole requirements being that a term appear to be morphologically related to one of the verbs and, in the case of words appearing only in Webster's, that it be listed as an adjective or noun. This simple criterion gave us the broadest possible choice of related trait terms. Our initial list included almost 12,000 trait terms in total.

Because the initial list was developed from a comprehensive unabridged dictionary and from a 50-year-old list of trait terms, however, many of the terms would be unlikely to be used in everyday English today, e.g., meritmonger, lustick, jabbernowl, and other wonderful examples of the richness of the English language. Such trait terms are unlikely to influence the attribution of causality in modern situations.

In order to obtain a more current lexicon, 14 judges (primarily psychology graduate students and professors) were asked to review the list, each reviewing half of the trait terms. (This procedure was actually carried out prior to the review of the verbs described in

the prior section.) They were asked to cross a trait term off the list if:

1. they had never heard the word before; or
2. they had no idea what the word means; or
3. the word did not make reasonable sense in one of the following sentences:
   a. He/she is a(an) _____.
   b. He/she is a(an) _____ person.

If at least 4 out of the 7 judges crossed a word off the list, it was deleted. We considered this criterion to be quite liberal because our judges were much more literate than the general population. This procedure reduced the list of trait terms to approximately 6,300 words.

Although not deleted by the judges, 43 of the terms are listed as archaic or obsolete in Webster's and were therefore eliminated, e.g., calmy. All comparative and superlative forms (64 terms in our list), e.g., harder and hardest, were also eliminated as unnecessarily redundant. In addition, some verbs from the inital verb list were later eliminated, and therefore their associated adjectives and nouns as well. The list now included just under 5,000 trait terms.

Although the list did now contain only commonly used dispositional terms, many of these terms still did not provide a reasonable answer to the question "Why does Ted _____ Paul?". Some trait terms simply restated the interaction, e.g., "Why did Ted browbeat Paul? Because Paul is a browbeaten person." Other trait terms did not mean the same thing as the verb in the context of the

interaction, e.g., sluggish in relation to the verb slugged.

In order to weed out trait terms which do not adequately answer the causal question, we adopted the following criteria for inclusion:

1. When used in the context, "Because Ted (or Paul) is (a) _____ (person)", the term must provide a meaningful, nonambiguous, nontrivial, and nontautological answer to the question, "Why does Ted Ted _____ Paul?" (where the latter blank is replaced by the verb to which the dispositional term is putatively related).

Some of the types of terms eliminated by this criterion are:

a. Terms that merely restate, rather than explain, the interaction, e.g., browbeaten.

b. Terms whose current meanings are unrelated to the current meaning of the corresponding verb, e.g., sluggish.

c. "Self-" forms, e.g., self-confident.

2. The term must not refer to a role than can be performed by only a small minority of the population, such as a specific occupation or profession (e.g., psychoanalyst). However, traits or roles that may be gender-specific (e.g., motherly) were not excluded on that basis alone.

Eliminating dispositional terms based on these criteria reduced the list to approximately 2,700 terms. Interrater agreement was 93%, with disagreements resolved by discussion between the two researchers.

Classification of Verbs and Dispositional Terms

Our next task was to classify verbs as actions or states. When we prepared the aforementioned list of interactive verbs, we found

many that are poorly classified as either action or state verbs. For example, could verbs such as thought about, complemented, or surpassed be readily classified as either actions or states? Thought about seems to describe a cognition, not an action or state. Complemented seems to express a relation between the interactants, rather than an action, state, or experience. Surpassed seems to make a comparison between the interactants. We therefore excluded from this study any verbs that do not clearly fit the categories of action or state.

Our previous list provided us with approximately 1,500 interactive verbs, about 400 of which did not have related trait terms, or had trait terms that were eliminated by our list compilation criteria. Of the remaining verbs, we classified approximately 200 verbs as miscellaneous verbs, using the following category definitions:

1. Action verbs. A verb belongs to this category if and only if (a) its meaning is well accommodated by a term such as to do, to act, to behave, to perform, or to express, and (b) it names an event, or set of events, that normally involves action or behaviour on the part of the Agent that would be observable by someone present in the relevant situation(s).

2. State verbs. A verb belongs to this category if and only if (a) its meaning is well accommodated by a term such as to experience, to feel, to be, to inspire, or to affect, and (b) it names an event, or set of events, that could normally take place entirely within the mind (including the emotions) of the Experiencer and that would not necessarily be observable by someone present in the relevant

situation(s).

3. Miscellaneous verbs. A verb belongs to this category if it meets neither of the above sets of criteria, or if it meets both sets of criteria about equally well.

Some of the kinds of verbs that were classified as miscellaneous are:

a. Verbs with equally strong action and state senses, e.g., aggravate.

b. Verbs that fall between the action and state categories, i.e., verbs like evaluate and think about.

c. Verbs that express a judgement or comparison on the part of an observer, rather than an interaction (e.g., complement, deserve, and surpass).

d. A fourth category of excluded verbs do meet the criteria for action verbs but were excluded because they seem to name a completely bidirectional interaction (e.g., dance with) where both parties are, in a sense, Agents.

Some of the verbs we classified, when phrased negatively rather than affirmatively, have different active and stative senses. For example, the verb surprised in Ted surprised Paul has equally strong action and state senses, whereas in Ted did not surprise Paul it has a much stronger stative sense. Phrasing the verb negatively, therefore, sometimes resulted in a different classification of the verb. The verb avoided, for instance, has the adjectives adjectives avoidant (referring to the Agent) and avoidable (referring to the Patient) when affirmatively phrased, but did not avoid has only the

adjective unavoidable. The verb did not avoid was therefore classified as a verb with only Patient dispositional terms.

Interrater agreement in classifying the verbs was 96%, with disagreements resolved by discussion between the authors. Approximately 200 verbs were classified as miscellaneous, leaving a final sample of about 900 verbs.

Dispositional terms were classified as referring to either the Agent, Patient, Stimulus, or Experiencer. Those that referred to more than one role in an interaction were eliminated, as were those associated with verbs that were not included by the above criteria.

Because many of the remaining verbs have multiple related trait terms, we selected the "best" trait term in each case, i.e., the term which is most familiar and best answers the causal question. For example, for the verb trusted, which has trait terms like trustable, trustworthy, trusty, trustful, trusting, and overtrusting, we selected trustworthy as the best Stimulus term, and trusting as the best Experiencer term. Differences of opinion were resolved through discussion.

Pretest

We pretested a subset of the remaining verbs and dispositional terms to ensure that those used in Study 1 were of reasonably high familiarity, that the verbs name relatively significant (not trivial) interactions, and that the dispositional terms provide reasonably adequate explanations for why the interaction occurred. Because the criteria used for inclusion of verbs and trait terms on our original lists were fairly minimal, we wanted to ensure that we used in Experiment 1 only familiar and significant verbs and dispositional

terms, as well as terms that provide a reasonable explanation for why the interaction occurred. We also pretested for interaction and disposition valence and unusualness, but these ratings did not form part of the "eligibility" criteria for the experiments per se. (We did take them into account later, however, when checking on the comparability of verb sets.)

The list of action and state and state verbs was divided into 6 categories: Action and State verbs, each subdivided into verbs with only dispositional terms that refer to the Agent or Stimulus, verbs with only dispositional terms that refer to the Patient or Experiencer, and verbs with both types of dispositional terms.[1] A random selection from each of the categories provided 243 verbs and 320 related trait terms for our test. Approximately half of the verbs and dispositional terms were affirmatively phrased (e.g., attracted, attractive) and half were negatively phrased (e.g., did not envy, unenviable).

The total list of 243 verbs was randomly divided into 3 booklets, with 10 subjects rating the verbs in each third of the list for valence, unusualness, and significance of the interaction, and familiarity of the word. The dispositional term list was also randomly divided into 3 booklets so that 10 subjects each rated one-third of the total list for valence and unusualness of the trait attribute, and familiarity of the word. Finally, 16 of our subjects rated all of the trait terms in a single booklet on their adequacy in answering the causal question. Appendix A presents the exact instructions and rating scales employed. To control for possible order effects, two different orders of items were used for each of

the above tasks.

A total of 76 male and female native English-speaking university students participated in this study, receiving course credit for their participation. Before beginning the rating task, subjects were briefly told the purpose of the pretest and asked to excercise care in making the ratings. They were especially asked not to skip over any ratings, even if they were uncertain of the meaning of the word. Subjects were given 1 hr to complete their ratings, and received a full debriefing at the end of the session.

Prior to making the final selection of verbs for use in Experiment 1, the verb ratings were analyzed and all verbs whose average familiarity ratings or significance ratings fell below the scale midpoint of 5 were eliminated from our sample. In addition, all verbs whose dispositional terms either were unfamiliar or did not adequately answer the causal question (mean ratings less than 5) were also eliminated. Thus, we selected only those words that were familiar and significant to our subjects, and only those dispositional terms that provided a reasonable explanation for why the interaction occurred.

Experiment 1

In this experiment, our objectives were to investigate the generality of the Agent-Patient and Stimulus-Experiencer schemas, and, more particularly, to discover if the existence of derived dispositional forms attributive to one or the other role might, in fact, moderate the effects of the causal schemas, i.e., to examine whether verbs with only Patient or Experiencer dispositional terms are given different causal interpretations than verbs with only Agent

or Stimulus dispositional terms. We predicted that:

1. The tendency to assign more causal weight to the Agent than to the Patient of an interaction will be greater in the case of verbs having only Agent-attributive dispositional terms than in the case of verbs having only Patient-attributive terms.

2. The tendency to assign more causal weight to the Stimulus than to the Experiencer of an interaction will be greater in the case of verbs having only Stimulus-attributive dispositional terms than in the case of verbs having only Experiencer-attributive terms.

We also included a priming manipulation in this study. Half of our subjects were primed with the dispositional terms related to the verbs used in the main experiment by being asked to think of words similar in meaning. Our primary reason for including this condition was simply to maximize our chances of finding an effect of dispositional term on causal attribution. However, the results of this manipulation might also furnish some evidence for or against the possibility that cognitive accessibility of the term is somehow an integral part of the attribution process, even though we did not advance any formal predictions regarding its effect.

Method

Verb selection. A total of 48 verbs were used in this experiment. We included 12 verbs from each of the four categories: Agent Only verbs (whose derived dispositional terms refer to the Agent role), Patient Only verbs (whose dispositional terms refer to the Patient role), Stimulus Only verbs (whose dispositional terms refer to the Stimulus role), and Experiencer Only verbs (whose dispositional terms refer to the Experiencer role). Half of the

verbs in each category were affirmatively phrased (e.g., followed), and half were negatively phrased (e.g., did not challenge). In order to control for possible effects of sentence position on attribution to a role, half of the verbs had the Agent or Stimulus as the subject of the sentence, and half had the Patient or Experiencer as the subject. Although state verbs exist that have the Stimulus as the object of the sentence (e.g., Ted detested Paul) as well as the subject (e.g., Ted thrilled Paul), action verbs almost always have the Agent as the subject of the sentence. We therefore phrased half of the action verbs in the passive voice (e.g., Ted was ignored by Paul), where the Patient becomes the surface subject of the sentence.

As previously mentioned, we randomly selected 48 verbs from our pretested sample. This selection process was reasonably successful in equating the verb categories on the four dimensions of interaction valence, interaction unusualness, disposition valence, and disposition unusualness, in order to preclude alternative explanations for our results. (For example, it may be that negative dispositional terms bias attributions toward the Agent or Stimulus rather than toward the Patient or Experiencer.) Fortunately, the 12 Agent Only verbs did not differ, as a group, from the 12 Patient Only verbs on any of the four dimensions. However, the 12 Stimulus Only verbs did differ from the 12 Experiencer Only verbs in one respect--the interactions named by the Experiencer Only verbs were rated as somewhat more unusual, on average, than the interactions named by the Stimulus Only verbs, $p < .05$. Because the rated unusualness of the state verb interactions turned out to be somewhat positively correlated with the tendency to assign greater causal weight to the

Stimulus, however, this difference actually works against our hypothesis.

In sum, the structure of the total 48-verb set can be conceptualized as a 2 (Type of verb: action vs. state) x 2 (Type of dispositional term: Agent/Stimulus vs. Patient/Experiencer) x 2 (Sentence subject: Agent/Stimulus vs. Patient/Experiencer) x 2 (Phrasing: affirmative vs. negative) fully crossed factorial, with 3 verbs in each of the 16 cells.

Although verbs in each of the 16 categories were randomly selected from the pretested verbs that met our criteria, it was necessary to make one exception to this procedure. One of the 16 categories is very rare, i.e., affirmatively phrased Experiencer Only verbs where the Stimulus is the subject of the sentence. Only two verbs and their related dispositional terms in this category met our criteria--obsessed and obsessive, and overexcited and overexcitable. To avoid unequal numbers of verbs in the 16 categories, we used worried as the third verb. Although this verb does have an adjective that refers to the Stimulus (worrisome) as well as an adjective that refers to the Experiencer (worrywart), worrisome did not meet our criteria for explanatory adequacy. Again, this addition could only work against our hypothesis in that the adjective worrisome might bias causal attributions to the Stimulus despite the influence of the Experiencer adjective worrywart.

Procedure. The experiment was introduced to subjects as research into how people perceive the cause of an event when provided with minimal information about that event. Subjects were seated at individual tables in a large room. All instructions (see Appendix B)

and tasks were provided in envelopes labelled 1, 2, and 3. Subjects were required to proceed through the envelopes in that order.

Envelope 1 contained the priming manipulation, presented as a 15 min task supposedly assessing subjects' intuitions about the meanings of English words. In the Primed condition, subjects reviewed each of 48 dispositional terms, and were required to write down a word that is roughly similar in meaning to each of the terms. The terms were those associated with the 48 verbs involved in the causal-attribution phase of the study. In the Unprimed condition, subjects reviewed each of 48 non-dispositional words unrelated to the verbs and were also required to write down a word that is roughly similar in meaning to each of the terms. In both conditions, we inserted 3 buffer items at the beginning and end of the term lists.

The contents of Envelope 2 instructed subjects (see Appendix B) to answer the 48 questions that constituted our causal-attribution measures. Each question was presented in the following format:

Ted did not like Paul.

To what extent was this because of:

1. some characteristic of Ted's?

to a very small extent .... 1 2 3 4 5 6 7 8 9 .... to a very large extent

2. some characteristic of Paul's?

to a very small extent .... 1 2 3 4 5 6 7 8 9 .... to a very large extent

Two different random orders of verbs (all in the past tense) were used in the booklets. A variety of personal names were also used, all male. For half the subjects, the two names used for a given verb were listed in one order (e.g., Bill noticed Pete), and

for the other half, the names were listed in the reverse order (e.g., Pete noticed Bill).

Envelope 3 contained a suspiciousness probe. All subjects were then provided with a complete written debriefing.

Subjects and Design. The subjects were 56 native English-speaking undergraduates who participated in partial fulfillment of a course requirement.[2] There were 7 subjects (3-4 males and 3-4 females) in each cell of the 2 (Unprimed vs. Primed condition) x 2 (Name order) x 2 (Verb order) between-subjects design.

Results and Discussion

We predicted that the tendency to assign more causal weight to the Agent than to the Patient of an interaction would be greater in the case of verbs having only Agent-attributive terms. For state verbs, we predicted that the tendency to assign more causal weight to the Stimulus than to the Experiencer of an interaction would be greater for verbs having only Stimulus-attributive terms. That was exactly what we found.

Mean causal weightings for each verb for the Primed and Unprimed conditions are shown in Tables 1 to 4 in order of largest to smallest predicted effect. In the Unprimed condition, the Adjective x Role interaction effect for action verbs was significant, $F(1,27) = 48.06$, $p < .001$. As the means in Table 5 suggest, the tendency to assign more causal weight to the Agent than to the Patient was substantially reduced in the case of Patient Only (difference = +0.17), compared to Agent Only (difference = +1.71) verbs. For state verbs, the Adjective x Role interaction was also significant, $F(1,27) = 15.01$, $p < .001$. Slightly greater causal weight was assigned to the

Table 1

Causal Weightings for Agent Only Verbs: Means and Standard Deviations (in Parentheses)

Verb	Dispositional Term	Unprimed		Primed	
		Agent	Patient	Agent	Patient
obstructed	obstructive	7.00 (1.80)	4.68 (1.49)	7.29 (1.41)	3.75 (2.07)
was defied by	defiant	7.32 (1.28)	4.75 (2.14)	7.18 (1.19)	4.14 (1.98)
was mismanaged by	mismanaging	6.79 (1.97)	5.43 (2.25)	7.21 (1.79)	4.18 (1.91)
did not confess to	unconfessing	7.18 (1.70)	4.75 (2.34)	6.71 (1.72)	5.00 (2.36)
did not repent to	unrepentant	7.04 (1.55)	4.32 (2.09)	6.07 (2.07)	4.89 (1.99)
was not preached at by	unpreaching	7.04 (1.67)	5.43 (2.41)	6.18 (2.28)	4.46 (2.28)
combatted	combative	7.11 (1.20)	5.68 (1.93)	7.14 (1.04)	5.54 (1.77)
was not assisted by	unassisting	6.21 (1.81)	5.14 (2.07)	6.46 (1.95)	4.54 (2.19)
was protected by	protective	6.96 (1.71)	5.89 (1.79)	6.86 (1.72)	5.14 (2.17)
did not aggress against	unaggressive	7.14 (1.53)	5.82 (1.76)	6.39 (1.85)	5.04 (2.19)
was not smiled at by	unsmiling	7.11 (1.23)	4.96 (2.35)	5.75 (1.97)	5.50 (1.95)
followed	follower	6.39 (1.89)	5.86 (2.24)	5.25 (2.15)	6.64 (2.02)

Table 2

Causal Weightings for Patient Only Verbs: Means and Standard Deviations (in Parentheses)

		Unprimed		Primed	
Verb	Dispositional Term	Agent	Patient	Agent	Patient
was not corrupted by	incorruptible	4.54 (2.44)	7.29 (1.72)	3.64 (2.16)	7.46 (2.32)
recommended	recommendable	5.11 (2.06)	7.64 (1.22)	3.89 (1.81)	7.64 (1.57)
was not bribed by	unbribable	5.07 (2.46)	6.50 (2.27)	3.75 (2.19)	6.96 (2.22)
was identified by	identifiable	5.32 (2.55)	6.04 (2.24)	4.21 (2.10)	6.57 (2.28)
was not stopped by	unstoppable	6.11 (2.33)	5.96 (2.59)	4.79 (2.08)	6.39 (1.85)
sucked in	sucker	7.07 (1.61)	6.57 (1.99)	6.43 (1.73)	6.93 (2.05)
did not heal	unhealable	5.71 (2.29)	5.29 (2.54)	4.89 (2.18)	4.93 (2.92)
did not challenge	unchallengeable	6.86 (1.82)	6.04 (1.86)	5.54 (2.17)	5.50 (2.28)
was ignored by	ignorable	7.07 (1.51)	5.57 (2.04)	5.64 (2.30)	6.00 (2.09)
was presented by	presentable	6.18 (2.44)	3.93 (2.36)	5.32 (2.23)	5.36 (2.16)
did not avoid	unavoidable	6.82 (1.39)	4.50 (2.41)	5.68 (2.28)	5.39 (2.17)
outwitted	witless	7.64 (1.54)	6.18 (2.18)	7.36 (1.50)	5.14 (2.21)

Table 3

Causal Weightings for Stimulus Only Verbs: Means and Standard Deviations (in Parentheses)

		Unprimed		Primed	
Verb	Dispositional Term	Stimulus	Exper.	Stimulus	Exper.
thrilled	thrilling	7.25 (1.27)	5.61 (2.11)	7.75 (0.84)	3.82 (2.02)
bedazzled	bedazzling	7.43 (1.48)	5.54 (2.12)	7.68 (1.56)	4.21 (2.06)
uplifted	uplifting	7.07 (1.80)	5.57 (1.81)	7.54 (1.40)	3.86 (2.17)
noticed	noticeable	6.29 (1.82)	6.04 (1.99)	7.43 (1.64)	3.61 (1.79)
detested	detestable	6.39 (2.04)	6.32 (2.20)	7.07 (1.76)	4.54 (2.28)
did not like	unlikeable	6.61 (1.89)	6.07 (1.88)	6.75 (1.86)	4.79 (2.06)
did not interest	uninteresting	6.00 (1.94)	6.18 (2.28)	6.32 (2.06)	4.96 (2.19)
did not motivate	unmotivating	5.75 (1.90)	5.86 (1.96)	6.04 (2.32)	5.32 (1.89)
did not accept	unacceptable	6.04 (1.92)	6.32 (1.98)	6.21 (1.81)	6.11 (1.89)
did not surprise	unsurprising	5.43 (2.35)	6.18 (1.72)	5.79 (2.17)	5.39 (2.42)
misinterpreted	misinterpretable	5.46 (1.99)	7.39 (1.32)	4.82 (2.13)	6.21 (1.71)
did not remember	unmemorable	4.79 (2.32)	7.04 (1.53)	4.64 (2.16)	6.32 (2.06)

Table 4

Causal Weightings for Experiencer Only Verbs: Means and Standard Deviations (in Parentheses)

		Unprimed		Primed	
Verb	Dispositional Term	Stimulus	Exper.	Stimulus	Exper.
did not resent	unresentful	4.32 (1.83)	7.07 (1.41)	5.07 (2.07)	6.39 (1.91)
doted on	doting	4.54 (1.64)	7.11 (1.47)	5.14 (2.07)	6.39 (1.77)
did not appreciate	unappreciative	3.96 (1.88)	6.75 (1.67)	4.89 (2.27)	5.86 (2.07)
overestimated	overestimating	5.57 (1.91)	6.79 (2.02)	4.57 (2.17)	6.68 (1.36)
did not daunt	undauntable	5.04 (1.93)	6.43 (1.45)	4.79 (2.06)	6.29 (1.90)
did not care about	uncaring	5.46 (1.90)	6.50 (2.24)	5.46 (2.17)	6.68 (1.52)
obsessed	obsessive	5.96 (2.50)	6.32 (2.11)	5.89 (1.81)	6.32 (2.24)
softened toward	soft-hearted	5.93 (2.09)	6.71 (1.78)	6.11 (1.57)	5.86 (1.60)
did not discourage	undiscourageable	6.39 (1.73)	5.75 (2.22)	5.21 (2.48)	5.75 (2.34)
did not fulfill	unfulfillable	6.21 (2.08)	6.57 (1.37)	6.32 (2.07)	5.82 (2.02)
overexcited	overexcitable	6.36 (2.04)	6.39 (2.22)	6.32 (1.54)	5.89 (2.02)
worried	worrywart	6.79 (1.71)	5.82 (2.14)	6.00 (2.37)	5.61 (1.93)

Table 5

Primed and Unprimed Causal Weightings by Verb Class

Verb Categories	Schematic Role: Agent/Stimulus	Schematic Role: Patient/Experiencer
	Unprimed Condition	
Action Verbs		
Agent Only	6.94	5.23
Patient Only	6.12	5.96
State Verbs		
Stimulus Only	6.21	6.18
Experiencer Only	5.54	6.52
	Primed Condition	
Action Verbs		
Agent Only	6.54	4.90
Patient Only	5.10	6.19
State Verbs		
Stimulus Only	6.50	4.93
Experiencer Only	5.48	6.13

Stimulus in the case of Stimulus Only verbs (difference = +0.03), whereas greater causal weight was assigned to the Experiencer in the case of Experiencer Only verbs (difference = -0.97). For both action and state verbs, a main effect was also found for schematic role, $F(1,27) = 19.57$, $p < .001$ for action verbs, and $F(1,27) = 5.47$, $p < .05$ for state verbs. However, the effect for state verbs was not in the direction predicted by Brown and Fish (1983), i.e., toward the Stimulus. In fact, there was a tendency to assign greater causal weight to the Experiencer than to the Stimulus, although this primarily occurred when the verb was negatively phrased. There was no role effect for affirmatively phrased state verbs.

In the Primed condition, the Adjective x Role interaction was highly significant for action verbs, $F(1,27) = 74.75$, $p < .001$. More causal weight was assigned to the Agent than to the Patient of an interaction if the verb had only Agent-attributive terms (difference = +1.64), and more to the Patient than to the Agent if the verb had only Patient-attributive terms (difference = -1.10). Again, for state verbs the interaction effect was also significant, $F(1,27) = 44.00$, $p < .001$. More causal weight was assigned to the Stimulus of an interaction than to the Experiencer if the verb had only Stimulus-attributive terms (difference = +1.57), and more to the Experiencer than to the Stimulus if the verb had only Experiencer-attributive terms (difference = -0.65). A main effect was found for schematic role for state verbs, $F(1,27) = 5.93$, $p < .02$, but not for action verbs, $F = 1.64$, ns.

As shown in Table 5, priming the related dispositional terms has the overall effect of increasing the causal weight assigned to the

corresponding role. The Priming condition x Adjective x Role interaction was significant, both for action verbs, $F(1,55) = 9.41$, $p < .01$, and for state verbs, $F(1,55) = 8.21$, $p < .01$.

It is evident from our results that we found strong support for our hypotheses, even in the Unprimed condition which more closely approximates everyday life. The tendency to assign greater causal weight to the role referred to by dispositional terms related to the verb seems to be the most influential determinant of causal attributions to a given role.

It is interesting to note that the verb worried, which was classed as an Experiencer Only verb though it has both Stimulus and Experiencer terms, has only a causal weighting of 5.71 to the Experiencer and 6.39 to the Stimulus over both priming conditions, i.e., it is one of our weakest results.

Even though we found significant differences between the various sets of verbs, we cannot unequivocally rule out the possibility that some other difference between the verb sets might have accounted for our results. Because our verb-categories may be confounded with other features of the English language, it is possible that some third variable could explain the findings in Experiment 1. We therefore supplemented this essentially correlational, natural-language study with a truly experimental investigation using nonsense verbs and adjectives.

Experiment 2

Certain adjectival suffixes in the English language normally refer to the subject of the sentence, and others refer to the object of the sentence. For example, "-ing" suffixes normally refer to the

subject of the sentence, not the object (e.g., loving), and "-able" suffixes normally refer to the object of the sentence, not the subject (e.g., recommendable). We therefore presented subjects with sentences which suggest that a given nonsense verb represents either an action or a state, as well as information about the existence of certain dispositional adjectives associated with the verb. If our hypothesis is correct, we should find that available forms of nonsense dispositional terms derived from the nonsense verbs influence causal attributions, above and beyond any effect of whether the verb represents an action or a state.

Method

Subjects and design. Subjects were 36 native English speaking university students in introductory psychology classes, receiving course credit for their participation. The design of this study was a 2 (Type of verb: action vs. state) x 2 (Type of dispositional term: Sentence subject vs. Sentence object) factorial. Both factors are within-subjects. Four nonsense verbs were developed for use in the study, e.g., verd.

Four statement versions were prepared, one for each of our four conditions, with one nonsense verb per condition (see Appendix C). Each version contained two statements leading subjects to believe that the nonsense verb was either an action (e.g., To "verd" someone is to perform a certain action toward that person and When someone verds another person, this action is always apparent to anyone else who might be present) or a state (e.g., To "verd" someone is to experience a certain feeling toward that person and When someone verds another person, this feeling may or may not be apparent to

anyone else who might be present). An additional two statements provided information about the related nonsense adjectives and the role to which they referred. For nonsense adjectives that referred to the Agent or Experiencer, the statements were: A "verding person" can be defined as one who tends to verd other people and The phrase, "a verding person", is sometimes used to describe an individual. For adjectives that referred to the Patient or Stimulus, the statements were: A "verdable person" can be defined as one who tends to be verded by other people and The phrase, "a verdable person", is sometimes used to describe an individual.

A Latin square was used to counterbalance the order of presentation of the four stories, and the pairings of particular nonsense verbs with the four verb-adjective conditions. Each of the 36 subjects in this experiment received one of the four booklets, each given to 9 subjects (5 females and 4 males).

Procedure. Our study was introduced to subjects as research into how people come to understand the meanings of words. Subjects were seated at individual tables in a large room. All instructions and tasks were provided to subjects in one booklet.

The booklet contained the instructions (see Appendix C) and the four statement versions. Subjects were asked to carefully read each story and answer the question following it. Our dependent measures were their answers to those questions, e.g.:

Consider the following event: Ted verds Paul.

To what extent is this probably because of:

1. Some characteristic of Ted's?

to a very small extent ...1 2 3 4 5 6 7 8 9 ...to a very large extent

2. Some characteristic of Paul's?

to a very small extent ...1 2 3 4 5 6 7 8 9 ...to a very large extent

Results and Discussion

As predicted, when we examined the Adjective x Role interaction effects, we found that greater causal weight was assigned to the Agent than to the Patient if the verb had a related Agent adjective, and that greater weight was assigned to the Patient than to the Agent if it had a related Patient adjective, $F(1,35) = 17.34$, $p < .001$. Similarly, greater causal weight was assigned to the Stimulus than to the Experiencer if the verb had a related Stimulus adjective, and greater weight to the Experiencer than to the Stimulus if it had only related Experiencer adjectives, $F(1,35) = 7.05$, $p < .02$ (see Table 6). The main effect for role was not significant for either action or state verbs, both Fs < 1.

The results of our nonsense verb and adjective study are consistent with the findings in Experiment 1. Our hypotheses were supported in both experiments, in that the tendency to assign greater causal weight to roles referred to by dispositional terms related to the verb is consistent throughout. Although we did find some effects for schematic roles in Experiment 1, we did not in Experiment 2. This difference may be due to the fact that our action-state verb manipulation was simply not strong enough to instantiate schematic processing of the causal attributions. In every day life, the action-state distinction may be more relevant.

General Discussion

It is evident from our results that the availability of dispositional terms that refer to a particular role in a human

Table 6

Nonsense Verbs: Causal Weightings by Verb Class

Verb Categories	Schematic Role	
	Agent/Stimulus	Patient/Experiencer
Action Verbs		
Agent Only	6.42	4.86
Patient Only	4.61	6.28
State Verbs		
Stimulus Only	6.11	4.92
Experiencer Only	4.82	5.86

interaction can influence causal interpretations of that interaction, given that those terms are familiar and significant to the attributor, and that they provide a reasonable answer to the causal question "Why does Ted _____ Paul?" Our intent is not to suggest, however, that the Agent-Patient and Stimulus-Experiencer schemas are entirely unimportant in causal attributions. The results of Experiment 1 do suggest that the schemas may play a part in attributing the cause of an action or experience to a particular interactant in everyday life, although priming dispositional terms related to the verbs seems to change the pattern of the attributions.

If we further investigated a causal schema explanation for our results, we would find it necessary to expand Brown and Fish's (1983) verb classification scheme. A two-part classification of verbs as action or state seems too limited for the many different interactive verbs that exist in the English language. Au (1986) suggested that the Agent-Patient schema be subdivided into the Action-Agent schema for verbs that represent mainly intended or self-initiated actions (similar to Brown and Fish's Agent-Patient schema), and the Action-Patient schema for verbs that represent a reaction to some prior event. Action-Patient verbs such as praised or congratulated presuppose that an action on the part of the Patient has caused the Agent to react, therefore biasing the cause of the reaction to the Patient; e.g., Ted praised Paul because Paul had previously done something to merit praise. However, we do not feel that either Brown and Fish's or Au's verb classification scheme accounts for the complexity of situations that verbs represent. Furthermore, it would be necessary, according to our results, to postulate two further

causal schemas for verbs with only Patient or Experiencer dispositional terms. This argument then becomes circular in nature and redundant with a Whorfian explanation of our results.

A more fruitful approach may be to examine the ways the causal question, "Why does Ted _____ Paul?" is answered. For example, some trait terms seem to answer the causal question by implying that a deficiency exists on the part of one of the interactants that the interaction somehow remedies; e.g., Ted directed Paul because Paul was directionless. Other terms seem to answer the causal question by implying a process of contagion, such that the state or experience of one interactant elicits a related state or experience in the other; e.g., Ted panicked Paul because Ted was panic-stricken. Although these examples do not exhaust the possible types of answers to the causal question, they may lead us to investigate alternative causal schemas, and alternative cognitive explanations for our results.

A strictly Whorfian interpretation of our findings, as Brown and Fish (1983) outlined, more simply suggests that dispositional terms might influence causal attributions by a priming process. When a particular verb (e.g., hurt) is activated by the presentation of a sentence (e.g., Ted hurts Paul), that activation may flow to any trait term derived from the verb and stored in the memory network (e.g., hurtful). Activation of the dispositional term in turn may activate the definition of that term (e.g., the kind of person who hurts people), which may bias causal attributions toward the interactant referred to by the dispositional term (e.g., Ted hurts Paul because Ted is the kind of person who hurts people). Our results are consistent with a priming model of causal attribution, in

that causal attributions are indeed biased toward the interactant referred to by the dispositional term, and that priming the related dispositional term strengthens that causal attribution.

Another possibility is that Brown and Fish (1983) were correct in suggesting that dispositional terms develop because they are informative about a given role in an interaction. As we mentioned in introducing this study, Brown and Fish claim that adjectives that refer to the Agent or Stimulus are generally more informative about those roles than are adjectives that refer to the Patient or Experiencer. For example, in Ted obstructed Paul, it may be that Ted is seen as the cause of the interaction because many people like Paul could be obstructed by others, but fewer people are capable of, or willing to, obstruct someone. The adjective obstructive is more informative about Ted than the adjective obstructable (if it existed) would be about Paul, because to know that Ted is obstructive could be used to predict his behaviour whereas to know that Paul is obstructable is to know nothing more than that he is a part of the human race. As Brown and Fish suggest, the less general arguments are probably so because the dispositions in question depend on individual learning experiences and histories. If someone is a member of the human race, we know that person is capable of the whole spectrum of human emotions, experiences, and traits. However, the possession of a particular trait or disposition by someone is necessarily the result of that person's individual genetic heritage and personal history of experiences.

Though a "Whorfian" account of implicit causality may adequately explain how the availability of dispositional terms influences causal

attribution, as in the priming model, it does not address the issue of how these dispositional terms came to be available in the English language. It simply suggests that these terms are somehow available, and does not comment on the principles by which they come to be available. To explain this lack, we suggest that a portion of Brown and Fish's (1983) hypothesis may in fact be accurate--dispositional terms may indeed develop because they are more informative about given roles. Although Brown and Fish postulate that, in general, most dispositional terms that develop refer to the Agent or Stimulus roles because those roles are more informative, it seems unnecessary to postulate the existence of intermediate causal schemas governing verbs in the developmental process. All verbs can be individually considered in terms of an informativeness hypothesis. For example, in Ted obsessed Paul, many people (like Ted) could be the object of someone's obsession, but fewer people (like Paul) would become obsessed by someone else. In this case, the cause of the interaction is seen as being Paul (because he is an obsessive person). Similarly, in Ted recommended Paul, Paul is seen as the cause of the interaction because he is a recommendable person while few others are. If we were to suggest that adjectives like obsessive and recommendable are simply more informative about the interaction than are other possible adjectives that could develop in the English language, we would adequately account for why causal attributions are biased toward the Experiencer or Patient for these verbs. It would not be necessary to generalize by suggesting that Stimuli or Agents are always perceived as the cause of the interaction and governed by a particular cognitive schema. The informativeness hypothesis can be

used to explain causal attributions for each interactive verb in the English language, rather than classes of verbs, as Brown and Fish (1983) hypothesized.

Brown and Fish (1983), furthermore, suggest that these attribution patterns are related to attribution theory as formulated by Harold Kelley (e.g., 1967; Kelley and Michela, 1979). Kelley suggests that people use Consensus, Distinctiveness, and Consistency information to make judgements about the causes of events. If we adapt attribution theory to the situation where both participants in the event are persons, consensus and distinctiveness kinds of information could be applied to attributions about interpersonal interactions (consistency information is not important to our argument here). For example, if Ted obstructs Paul, few other people obstruct Paul (Low Consensus), and Ted obstructs many people other than Paul (Low Distinctiveness), then a causal attribution is made to the Agent of the interaction, Ted. If Ted likes Paul, many other people like Paul (High Consensus), and Ted likes few people other than Paul (High Distinctiveness), then a causal attribution is made to the Stimulus of the interaction, Paul. If the informativeness hypothesis also applies to verbs with only Patient or Experiencer dispositional terms, we would expect the next two examples to conform with the actual causal attributions made in Experiment 2. For instance, if Ted obsesses Paul, other people also obsess Paul (Low Distinctiveness), and Ted obsesses few people other than Paul (Low Consensus), then the cause of the interaction is attributed to Paul, the Experiencer of the interaction, because he is an obsessive person. If Ted recommends Paul, other people also recommend Paul

(High Consensus), and Ted recommends few people other than Paul (High Distinctiveness), then Paul is seen as the cause of the interaction because he is a recommendable person. In these cases, whether the person is the Agent or Patient [Stimulus or Experiencer] of the interaction is not directly relevant to who is perceived as the cause of the interaction. However, the attributive pattern of who is perceived as the cause of the interaction is consistent, i.e., both Low Consensus and Low Distinctiveness information, and High Consensus and High Distinctiveness information, seem to define the interactant who is perceived as having caused the interaction. Furthermore, this attributive pattern may also define to which role the related dispositional terms refer. For example, if we were unfamiliar with the English language, and knew that most people have occassion to recommend someone at some point in their lives, whereas fewer people are recommended by others, we could probably predict with reasonable accuracy that the adjective recommendable exists in the English language.

Recent research has shown that, in fact, Consensus and Distinctiveness information does account for about 40-50% of the causal attribution variance for individual verbs, but also that there is a significant adjective-attribution relation that is unmediated by that information (Hoffman, 1988, personal communication). It is possible that the implicit characteristics of the verb from which the dispositional term is derived may also influence which potential dispositional term is considered more informative and therefore comes to be commonly used in the English language. Once the dispositional term exists in English, it may further influence causal attributions

by a "Whorfian" priming process. Alternative cognitive schemas may also play a part.

This research, however, was not designed to test potential explanatory models, but only to demonstrate that an effect of related dispositional term on causal attribution exists. Further research will be necessary to pin down the relative contributions of each potential model. Whatever those contributions may be, we suggest that the availability and informativeness of dispositional terms derived from the verb is a key factor in determining which participant in an interpersonal interaction is perceived to be causally responsible for that interaction.

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Footnotes

[1]We found that roughly 95% of the (affirmatively phrased) action verbs have terms attributive to the Agent and that roughly 25% have terms attributive to the Patient (these percentages sum to more than a hundred because many verbs have both types of terms). The corresponding percentages reported by Brown and Fish (1983) for their smaller sample of verbs were 94% and 14%. Roughly 85% of our (affirmatively phrased) state verbs have terms attributive to the Stimulus and roughly 40% have terms attributive to the Experiencer; the percentages reported by Brown and Fish were 95% and 15%.

[2]Five additional subjects were actually run in Experiment 1 but were later replaced: two responded mechanically, two omitted a page of responses, and one included an excessive number of inappropriate responses to the priming task.

Appendix A

Pretest Instructions

INSTRUCTIONS

On the following pages, you will find sentences describing interactions between two people, and also describing a trait or quality of one of the persons, e.g., "Ted questioned Paul because Ted is a questioning person" and "Ted lamented Paul because Paul is a lamentable person". Please read each sentence carefully, and rate the underlined trait on the following scale. Circle the number that most closely represents your opinion.

VERY INADEQUATE... 1 2 3 4 5 6 7 8 9 ...VERY ADEQUATE
EXPLANATION EXPLANATION

How adequately does the underlined trait provide an explanation for why the interaction occurred?

For example, in the sentence "Ted questioned Paul because Ted is a questioning person", how well is Ted's questioning Paul explained by the fact that Ted is a questioning person? In the sentence "Ted lamented Paul because Paul is a lamentable person", how well is Ted's lamenting Paul explained by the fact that Paul is a lamentable person?

PLEASE DO NOT OMIT ANY RATINGS. ENSURE THAT YOU MAKE A RATING EVEN IF YOU ARE UNSURE.

INSTRUCTIONS

On the following pages, you will find sentences describing personal traits or attributes. Please read each sentence carefully, and rate the underlined trait on each of the following scales. Circle the number that most closely represents your opinion. This page has been separated from the others so that you may refer to it as you proceed through the sentences.

VERY NEGATIVE... 1 2 3 4 5 6 7 8 9 ...VERY POSITIVE
TRAIT TRAIT

Does the underlined word represent a negative trait or a positive trait?

VERY UNUSUAL.... 1 2 3 4 5 6 7 8 9 ....VERY COMMON
TRAIT TRAIT

Does the underlined word represent an unusual trait or a common trait?

VERY UNFAMILIAR. 1 2 3 4 5 6 7 8 9 ...VERY FAMILIAR
WORD WORD

Is the underlined term itself a familiar word or an unfamiliar word? NOTE that whereas the first two questions ask you about the trait, this question is about the word itself.

For example, consider the sentence, "Ted is a lamentable person". The first question asks you to rate the extent to which "lamentable" is a negative vs. a positive personal trait. The second question asks you to rate the extent to which "lamentable" is an unusual or a common trait for a person to have. HOWEVER, the last question asks you to rate the extent to which the word "lamentable" is unfamiliar vs. familiar to you, as opposed to the trait described by the word.

PLEASE DO NOT OMIT ANY RATINGS. ENSURE THAT YOU MAKE A RATING EVEN IF YOU ARE UNSURE.

INSTRUCTIONS

On the following pages, you will find sentences describing interactions between two persons. Please read each sentence carefully, and rate the underlined verb or verb phrase on each of the following scales. Circle the number that most closely represents your opinion. This page is separated from the other pages so that you may refer to it as you proceed through the sentences.

VERY NEGATIVE INTERACTION..... 1 2 3 4 5 6 7 8 9 ...VERY POSITIVE INTERACTION

Does the underlined verb or verb phrase represent a negative or a positive interaction?

VERY UNUSUAL INTERACTION..... 1 2 3 4 5 6 7 8 9 ....VERY COMMON INTERACTION

Does the underlined verb or verb phrase represent a unusual interaction or a common interaction?

VERY INSIGNIFICANT INTERACTION 1 2 3 4 5 6 7 8 9 VERY SIGNIFICANT INTERACTION

Does the underlined verb or verb phrase represent a trivial, insignificant interaction or a meaningful, significant interaction?

VERY UNFAMILIAR WORD... 1 2 3 4 5 6 7 8 9 ...VERY FAMILIAR WORD

Is the underlined verb (or the verb in the underlined phrase) itself a familiar word or an unfamiliar word? NOTE that whereas the first three questions ask you about the interaction, this question is about the word itself.

For example, consider the sentence, "Ted controverted Paul". The first question asks you to rate the extent to which "controverting" is a negative vs. a positive interaction. The second question asks you to rate the extent to which "controverting" is an unusual vs. a common interaction. The third question asks you to rate the extent to which "controverting" is a trivial, insignificant vs. a meaningful, significant interaction. HOWEVER, the last question asks you to rate the extent to which the word "controverted" is unfamiliar vs. familiar to you, as opposed to the interaction described by the word.

PLEASE DO NOT OMIT ANY RATINGS. ENSURE THAT YOU MAKE A RATING EVEN IF YOU ARE UNSURE.

Appendix B

Experiment 1 Instructions

In this questionnaire, you are being asked to think about the interpersonal interactions listed on the following pages. After each interaction, you are asked to what extent the interaction occurred because of one or the other of the persons mentioned. Please read each interaction carefully and circle the number that most closely represents your opinion.

For example,

Herb irritated Hank.

To what extent was this because of:

1. some characteristic of Herb's?

to a very small extent .... 1 2 3 4 5 6 7 8 9 ....to a very large extent

2. some characteristic of Hank's?

to a very small extent .... 1 2 3 4 5 6 7 8 9 ....to a very large extent

---

In other words, what we are asking you to do is judge the extent to which the interaction was due to some characteristic of Herb's vs. the extent to which the interaction was due to some characteristic of Hank's. We realize that what we are asking you to do is in some ways a very difficult task, in that we are providing you with only minimal information about the interaction. We further realize that more complete information about the nature of, or "background" to, the interaction would provide a more meaningful basis for the judgements we are asking you to make. However, the purpose of this particular study is precisely to discover how people make these sorts of judgements on the basis of very incomplete information.

This questionnaire is the most important part of this study, and is your final major task in today's session (the questionnaire in envelope three takes less than a minute to complete). Therefore, please take your time and try to respond carefully. Please respond to every question, even if you are unsure. In other words, please do not omit any ratings. When you are finished, please replace this questionnaire in its envelope, and proceed to envelope "3".

Appendix C

Experiment 2 Instructions and Sample Booklet

Important: Please read these instructions carefully before examining the contents of this booklet. Once you begin, work through the pages of the booklet in exactly the order in which they appear. Do not look forward or backward to other pages. It is very important that you follow this procedure exactly. Thank you for your cooperation.

This study has to do with how people learn the meanings of new words. To study this question, we have created some new words (or "nonsense words" as they are usually called) and have written sentences containing information about the words.

Your task is simply to study the sentences given for each word and then to answer the two questions on each word. Answer the questions by circling a number on the rating scale that best corresponds to your opinion.

Please note the following points:

1. Try not to read any meaning into the nonsense words other than that which is provided by the sentences using the words. That is, try not to respond to the nonsense word itself, but rather to the information given about the word.

2. No two of the sentence-sets on any of the four nonsense words are exactly alike, although certain pieces of information are repeated from one sentence-set to another.

3. Try to deal with each of the four words independently of the others; that is, try not to let your ratings about one word be influenced by your ratings about previous words.

4. Please make sure you give a rating for each of the two questions asked about each of the four words, even if you are unsure or feel that you are just guessing.

5. Please study the sentences given for each word very carefully, until you have thoroughly "digested" all of the information in the sentences, before you make your ratings on that word.

Thank you.

To "quim" someone is to perform a certain action toward that person.

A "quimming person" can be defined as one who tends to quim other people.

When someone quims another person, this action is always apparent to anyone else who might be present.

The phrase, "a quimming person," is sometimes used to describe an individual.

* * * * *

Consider the following event: Ted quims Paul.

To what extent is this probably because of:

1. some characteristic of Ted's?

to a very small extent	1	2	3	4	5	6	7	8	9	to a very large extent

2. some characteristic of Paul's?

to a very small extent	1	2	3	4	5	6	7	8	9	to a very large extent

To "gelf" someone is to experience a certain feeling toward that person.

A "gelfable person" can be defined as one who tends to be gelfed by other people.

When someone gelfs another person, this feeling may or may not be apparent to anyone else who might be present.

The phrase, "a gelfable person," is sometimes used to describe an individual.

* * * * *

Consider the following event: Don gelfs Mike.

To what extent is this probably because of:

1. some characteristic of Don's?

to a very small extent	1	2	3	4	5	6	7	8	9	to a very large extent

2. some characteristic of Mike's?

to a very small extent	1	2	3	4	5	6	7	8	9	to a very large extent

To "zick" someone is to experience a certain feeling toward that person.

A "zicking person" can be defined as one who tends to zick other people.

When someone zicks another person, this feeling may or may not be apparent to anyone else who might be present.

The phrase, "a zicking person," is sometimes used to describe an individual.

* * * * *

Consider the following event: Gary zicks John.

To what extent is this probably because of:

1. some characteristic of Gary's?

to a very small extent	1	2	3	4	5	6	7	8	9	to a very large extent

2. some characteristic of John's?

to a very small extent	1	2	3	4	5	6	7	8	9	to a very large extent

To "verd" someone is to perform a certain action toward that person.

A "verdable person" can be defined as one who tends to be verded by other people.

When someone verds another person, this action is always apparent to anyone else who might be present.

The phrase, "a verdable person," is sometimes used to describe an individual.

* * * * *

Consider the following event: Allen verds Tim.

To what extent is this probably because of:

1. some characteristic of Allen's?

to a very small extent	1	2	3	4	5	6	7	8	9	to a very large extent

2. some characteristic of Tim's?

to a very small extent	1	2	3	4	5	6	7	8	9	to a very large extent